PalmSphere

APRIL 2025 VOL:09

MPOC

INNOVATIONS IN PRACTICE: REGENERATIVE AGRICULTURE IN OIL PALM

EU TO DECIDE ON MALAYSIA'S CLASSIFICATION IN THE EUDR COUNTRY BENCHMARKING BY JUNE 2025

FREQUENTLY ASKED QUESTIONS (FAQ)

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MESSAGE FROM THE CEO

Belvinder Sron
CEO of MPOC

Dear Readers,

As we welcome another issue of PalmSphere, our commitment to advancing the Malaysian palm oil industry through science, sustainability and innovation remains stronger than ever. In this edition, we continue to explore how our collective efforts reshape the landscape of sustainable palm oil. This edition highlights a powerful reminder of palm oil's nutritional potential. Its unique nutrient profile in beta-carotene and vitamin E content offers promising solutions to vitamin A deficiency, a still-prevalent issue affecting millions globally. Its role in food security and human wellness underlines the broader contributions Malaysian palm oil can make to public health initiatives.

Turning to the regulatory landscape, we spotlight the EU's forthcoming decision on Malaysia's risk classification under the EUDR country benchmarking system. The outcome will have far-reaching implications for market access and the future of sustainable palm oil trade with Europe. We remain confident that Malaysia's sustainability credentials, anchored by MSPO certification, make a strong case for a low-risk classification. We also feature inspiring progress in the Innovations in Practice series. From nutrient recycling to biochar and intercropping, these on-the-ground efforts by smallholders and partners such as Wild Asia exemplify how nature-positive practices can lead to high yields, soil vitality and climate resilience.

As always, I thank our readers, partners, and changemakers for your continued support and engagement. Your partnerships and collaborations are vital as we continue championing Malaysia's palm oil as a sustainability, resilience and global relevance benchmark.

MORE THAN COLOUR: THE SCIENCE AND SOLUTIONS INSIDE RED PALM OIL

By Dr Nina Naquiah Ahmad Nizar, Assoc. Prof. Dr. Eddie Tan Ti Tjih, and Nur Alia Aqilah Mohd Rizal

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Vitamin A Deficiency

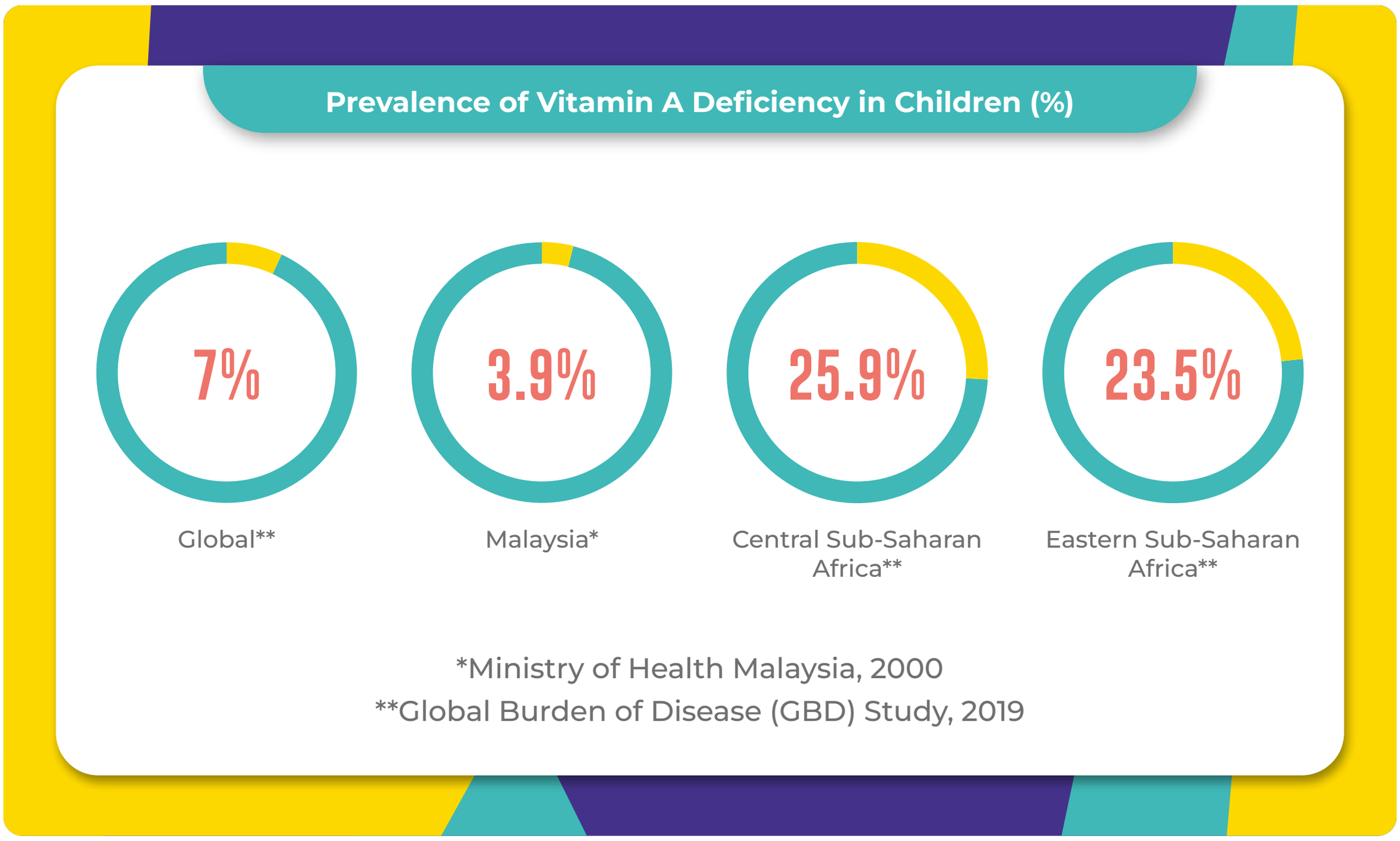
"Why can't I see anything?"

In January 2025, Malaysia was shocked by a tragic case involving a Standard 2 student who lost her sight. The child's vision loss was due to a severe vitamin A deficiency, diagnosed after multiple medical tests. A medical examination revealed that it resulted from prolonged consumption of processed foods. This alarming and entirely preventable case in Malaysia underscores the broader issue of vitamin A deficiency, a significant public health challenge nationally and globally (TheSun 2025; MStar 2025; Fong 2025).

Studies on Vitamin A Deficiency

A nationwide study by Malaysia's Ministry of Health in 2000 found that 3.9% of children under five had vitamin A deficiency (serum retinol <0.7 µmol/L).

Worldwide, the 2019 Global Burden of Disease (GBD) study estimated that the prevalence of vitamin A deficiency is around 7.0%, affecting 23.1 million children worldwide. The highest rates were reported in Central and Eastern sub-Saharan Africa, at 25.9% and 23.5%, respectively.



Improvements in Dietary Intake

The chart showed the prevalence of vitamin A deficiency in children. Despite the WHO's efforts in combatting this issue, disparities in economic conditions, healthcare access and access to nutritious food continue to hinder progress in addressing this preventable condition.

Hamer and Keusch (2015) summarised that improving dietary intake of foods rich in vitamin A (e.g., animal products) or beta-carotene is a sustainable solution in combatting or alleviating vitamin A deficiency.

The following are some possible strategies:

- Central fortification of processed foods (Especially beneficial to the urban population)
- Adding vitamin A sprinkles to food in homes, day-care centres and schools
- Promotion of beta-carotene-rich foods
- Developing genetically high beta-carotene levels-engineered crops

Interestingly, red palm oil has emerged as another effective strategy due to its high content of carotenoids, which can complement these efforts by providing a natural and sustainable source of vitamin A precursors.

Red Palm Oil

In Malaysia, the high content of carotenoids and tocotrienols in red palm oil is well documented. Red palm oil retains its carotenoids and vitamin E because it bypasses certain refining processes that typically degrade these nutrients. Its distinctive red appearance is attributed to its high carotenoid content and low free fatty acid levels (Tan et al., 2021). Red palm oil may help treat and prevent vitamin A deficiency and malnutrition. Research studies have revealed that red palm oil can increase provitamin A activity, improve immune function, and reduce the risk of atherosclerosis (Oguntibeju et al., 2009). Additionally, it alleviates ocular problems due to vitamin A insufficiency among youngsters and pregnant women (Loganathan et al., 2017).

Palm oil contains α-, β- and γ-carotenes, where the provitamin A compound, beta-carotene, in red palm oil has good bioavailability and is readily converted into vitamin A (retinol) only when the body needs it, preventing excessive accumulation. These carotenoids help prevent night blindness. Moderate amounts of palm oil should be incorporated into meals to ensure adequate vitamin A intake, especially in developing countries where vitamin A deficiency is a major problem among adults and children (Boateng, 2016).

Red palm oil may help treat and prevent vitamin A deficiency and malnutrition.

Recently, red palm oil has garnered attention as a fortification tool (Dong, 2017). Red palm oil's stability during food preparation and its ability to retain nutrients like carotenoids and tocotrienols make it ideal for fortification options. It has been successfully used as a cost-effective to improve vitamin A intake through fortified oils and other food products. The oxidative stability provided by its antioxidants extends the shelf life of fortified foods, ensuring nutritional quality over time. As one of the most productive vegetable oil crops globally, its high yield per hectare ensures efficient land use, making it a sustainable option for large-scale nutrition initiatives aligned with Sustainable Development Goal 2, which aims to end hunger, ensure food security, improve nutrition and promote sustainable agriculture (Tan et al., 2021).

VERSATILITY OF RED PALM OIL

Researchers have developed innovative products using red palm oil, such as a snack bar for pregnant women (Nurhusna et al., 2000) and ice milk with improved quality characteristics (Abd. El-Ghany, 2020). It has also been transformed into a powder through microencapsulation with enhanced antioxidant properties (Voon et al., 2015).

Red palm oil is used in various food applications; low-temperature cooking oils, margarines, shortenings, powdered fats, spreads, beverage emulsions, and encapsulated forms. It is also mixed into baked goods such as bread, sponge cakes, biscuits and even chilli-based products (Purnama et al., 2020).

Red palm oil is utilised in the supplements and pharmaceutical industries as a rich source of nutrients and antioxidants. It is often incorporated into nutritional supplements and pharmaceutical formulations targeting specific health conditions (Loganathan et al., 2017; Goon et al., 2019).

Therefore, utilisation records indicate that red palm oil can be extended across various food industry segments. By evaluating existing market gaps, opportunities can be identified for developing novel products fortified with red palm oil. Potential products include red palm oil emulsions, among others.

Red palm oil is a great option to combat global nutrition challenges as it can help reduce micronutrient deficiency while supporting sustainable agriculture practices.

In the next issue, the innovative developments of red palm oil in food and nutraceutical applications will be explored further.

MPOC ACKNOWLEDGES EUDR SIMPLIFICATIONS BUT CAUTIONS MORE EFFORTS REQUIRED TO BRING TANGIBLE BENEFITS FOR PRODUCING COUNTRIES

In a significant move to clarify the EU Deforestation Regulation (EUDR), the European Commission released a simplification package, prompting concerns from the Malaysian Palm Oil Council (MPOC) regarding further efforts needed.

THE European Commission published a new simplification package on 17 April 2025 for the EU Deforestation Regulation (EUDR), updating its Guidance and FAQ documents for importers and the competent authorities of Member States. This package follows through on the Commission's December 2024 pledge to "provide further clarification on the legislation and explore additional simplifications through updates of the guidelines and the FAQ document".

A central feature of the package is a proposal to significantly reduce the number of Due Diligence Statements (DDSS) that must be submitted via the EUDR's IT platform. The Commission estimates these changes will reduce compliance-related administrative costs for companies by 30%.

MPOC acknowledges the Commission's efforts to ease the administrative burden on businesses and strongly supports global initiatives to protect forests and preserve biodiversity. However, compliance mechanisms must reflect fundamental differences, as a one-size-fits-all approach imposes unnecessary costs on low-risk producers, which drives up prices for European consumers without delivering any environmental benefits.

While the simplification package includes long-awaited clarifications, such as allowing annual DDS submissions to be passed along supply chains, it offers no substantive update on the Commission's benchmarking process. These simplifications may not fully benefit producing countries, as they are still required to meet the EUDR's rigorous due diligence requirements, which consume significant financial resources, especially for smallholders.

> **"We believe further measures will be necessary to achieve the Commission's 30% cost reduction target. To deliver meaningful savings for both producers and consumers, the EU should move towards greater alignment with existing national certification schemes that meet equivalent standards. Additionally, a broader designation of low-risk status would reduce duplication and streamline compliance".**
>
> **Belvinder Sron,** CEO of MPOC

The EUDR minimises EU-driven deforestation and forest degradation. It requires seven commodities and their derivatives - cattle, cocoa, coffee, oil palm, rubber, soya, and wood entering the EU market to be deforestation-free, legally produced and covered by a due diligence statement. Of these seven commodities, Malaysia produces palm oil, rubber, timber, and cocoa.

EUDR will enter into the application by the end of 2025.

EU TO DECIDE ON MALAYSIA'S CLASSIFICATION IN THE EUDR COUNTRY BENCHMARKING BY JUNE 2025

The EUDR benchmarking system will classify producer countries into low-risk, standard-risk, or high-risk countries based on the risk of deforestation.

A decision on the long-anticipated country benchmarking system under the European Union Deforestation Regulation (EUDR) is expected soon. Following the EU's agreement to a crucial one-year postponement of the rules at the end of 2024, attention is shifting towards the start of the regulation application on 30 December 2025. From this date, the EUDR will apply to large palm oil-importing companies in the EU, allowing only palm oil not produced on land subject to deforestation after the 31 December 2020 cut-off date and legally produced to enter the EU market. Governed by one of the world's most stringent palm oil sustainability certification schemes, Malaysia is well-prepared to supply sustainable and traceable EUDR-compliant palm oil to its European customers.

With the EU providing legal certainty last year, Malaysian palm oil producers now have a clear timeline and clarity on data collection and due diligence requirements. However, one critical decision still needs to be taken before the end of the year - the classification of countries under the EUDR benchmarking system. This system will categorise producer countries into low-risk, standard-risk, or high-risk countries based on the risk of deforestation.

A low-risk classification would significantly ease administrative requirements for Malaysian producers and buyers by limiting obligations to data collection requirements (including determining the geolocation of production) and exempting importers from conducting a risk assessment or implementing additional risk mitigation measures.

The European Commission (EC) recently reaffirmed its commitment to delivering the benchmarking system by 30 June 2025, meaning a decision can be expected within the next two months. However, several key concerns remain unresolved from Malaysia's perspective. In its preliminary principles released last year, the EC indicated that most countries will be classified as low-risk. However, it failed to clearly outline how the benchmarking exercise would be conducted. While the classification relies primarily on absolute and relative deforestation data, questions persist about the quantitative threshold distinguishing low-risk countries from standard-risk countries and the timeframe over which deforestation rates will be assessed.

Malaysia is well-prepared to supply sustainable and traceable EUDR-compliant palm oil to the EU market.

The Malaysian Palm Oil Council (MPOC) has strongly advocated for Malaysia's classification as a low-risk country. Several international organisations including the United Nations Food and Agriculture Organisation (FAO) and the World Resources Institute, have recently documented a significant decline in forest loss in Malaysia. Palm oil is no longer a driver of deforestation in the country, and the Malaysian Sustainable Palm Oil (MSPO) certification scheme effectively prohibits deforestation for palm oil production after 2019.

The EC must consider these recent trends in its decision. Granting Malaysia a low-risk status would recognise its efforts and encourage other palm oil-producing countries to follow Malaysia's pathway in reducing forest loss. Ultimately, the EU must make the development of the classification system as transparent as possible and open to stakeholder input from third countries. Only under these conditions will the eventual ranking secure broad acceptance.

The MPOC has strongly advocated Malaysia's low-risk country classification, with apparent efforts from the MSPO certification scheme that effectively prohibits deforestation for palm oil production since 2019.

INNOVATIONS IN PRACTICE: REGENERATIVE AGRICULTURE IN OIL PALM

In part 1 of the 2-part article, Wild Asia, a social enterprise, introduces tried-and-tested farming techniques to oil palm farmers to boost productivity as well as resilience and improve ecosystem health, using the 'living lab' approach.

MUHARRAM Sompo's oil palm farm visitors are often struck by these first impressions – the lush vegetation and the cooler air.

Robust palm trees boast vibrant green fronds and red-orange palm fruits, with clumps of ginger plants intercropped between rows of trees. Pruned palm fronds are stacked neatly on the ground, speckled with microbe-rich worm castings. Healthy, mature *salak (Salacca zalacca)* trees take up one corner of the farm, whilst a DIY wooden compost bin heaped with farm wastes, livestock manure and food scraps sits at another corner. Unlike the hard, compact soil typically found in conventional farms, the ground feels bouncy underfoot.

Innovations in Practice is a series showcasing MSPO (Malaysian Sustainable Palm Oil) - certified farmers who adopt sustainable and management practices and carbon removals, via nature-based and low-tech solutions, as the pathway to nature-positive palm oil.

This independent smallholder's 1.2-ha farm in Sabah's Kinabatangan District is the model farm, which embraces the WAGS BIO methods. The integrated farming approach prioritises soil health as well as biodiversity, and eschews synthetic pesticides and fertilisers.

Muharram turns organic waste into compost, makes fruit and fish enzyme fertilisers from kitchen scraps, and applies these amendments to cultivate nutrient-rich soil. He uses free mill wastes like oil palm decanter cake and empty fruit bunches as organic fertiliser. His meticulously stacked fronds decompose faster, retain soil moisture and replenish nutrients.

Oil palm fronds are processed into biochar and readded to the soil to boost fertility and sequester carbon. The *salak* fruits and ginger crops supplement his income and help improve farm biodiversity. Abundant worm castings are used as a natural fertiliser to grow pineapples, chillies, and brinjals in his home garden. These practices embody a closed-loop agriculture system that recycles all nutrients and organic matter material back to the soil it grew in, preserving the nutrients and carbon levels within the soil.

In short, Muharram works in concert with the natural systems and leverages cheap or free, low-tech solutions to produce optimal outputs whilst treading lightly on the earth.

"Since I started my BIO journey in 2019, my trees have become healthier, the palm fruits are denser, and my yields are fairly consistent," says the MSPO (Malaysian Sustainable Palm Oil) - certified farmer. His fresh fruit bunches (FFB) yield ranges from 24 to 27 metric tonnes per hectare per year, way above the national average of 16.70 tonnes (2024 Malaysian Palm Oil Board figures). Over the past five years, as the Malaysian Palm Oil Board (MPOB) recommended, his yield has increased by almost 6%, even though his trees are at the optimal replanting age of 24 - 25.

"I'm not too worried about the bottom line because my production costs are low," says the 43-year-old who has been adopting chemical-free farming for five years. "As long as my soil is healthy, my farm will remain productive in the long run."

Organic Matter Matters

In 2019, Wild Asia kick-started WAGS BIO to help oil palm farmers switch from 'conventional' agriculture to chemical-free, regenerative agriculture. Conventional oil palm farming typically involves monocropping and the liberal use of agrochemicals, leading to degraded soil and decreased understory vegetation.

However, the seed for WAGS BIO was first planted in 2018 when WA initiated the 'Living Soils' project. At that time, WA had been working with farmers under the Wild Asia Group Scheme (WAGS) to help them meet international sustainability standards since 2012.

"We knew about organic farming, but it was almost unheard of in oil palm," says Wild Asia Founder and Executive Director Dr Reza Azmi. "We started tapping into learnings from the past. Pioneers like Sir Alfred Howard understood that healthy, living soils are the key to combating pests and diseases in crops."

Muharram is an independent smallholder who owns a 1.2-ha farm in Sabah's Kinabatangan District.

Known as the father of the organic farming movement and the 'champion of compost', Howard carried out experiments from England to India in the early 1900s. He established that organic matter, soil fertility, and plant health are intrinsically linked. A 'living soil' is a community of microbes that break down organic matter, which, in turn, supplies nutrients to the plants, resulting in healthier trees that are more resistant to diseases and pests.

Healthy living soils are the key to thriving, resilient crops.

"We gathered evidence for this (BIO) approach by studying natural farming practitioners and reading up on older literature and current scientific works in other fields," adds Reza, who leads Wild Asia's senior team of biologists, ecologists and biodiversity experts.

"At our first Living Soils workshop, we showed farmers the basic ingredients for healthy forest soils and taught them ways to improve soil health."

The programme has since grown and evolved as Wild Asia explores innovative practices, tailors the farming approach to local contexts and tests them out on working farms. One of its main agendas is to help farmers build resilience to climate change and swings in palm oil prices.

Frond stack modification, one of the BIO routines Muharram adopted on his farm.

Learning by Doing

Structured in incremental stages, WAGS BIO is open to all WAGS members who are MSPO and internationally certified. The BIO adoption is gradual and based on each farmer's skills, knowledge, interest and resources.

From three pioneer BIO farmers, including Muharram, WAGS BIO now has 110 members, including a small grower and one estate, managing BIO plots totalling 75 hectares in Sabah, Perak, Selangor, and Johor (August 2024 figures). In addition, Sabah-based BIO farmers are practising crop diversification by planting ginger, medicinal plant *mas cotek (Ficus deltoidea)* and *Laran (Neolamarckia cadamba)* trees, covering a total of 194 hectares of land.

"Most of our work in West Malaysia is in collaboration with other organisations for specific research projects (SAN-Ferrero project)," says Wild Asia Director and Advisor Peter Chang, who oversees the WAGS BIO operations.

"In Sabah, most projects are supported by grants (e.g., Yayasan Hasanah, Borneo Orangutan Survival - Germany, Seventh Generation, and other SPIRAL partners) to further ongoing work, to grow projects like biochar and explore novel ideas like a low-energy composting system to bulk-produce compost."

The 'Living Labs'

Through regional hubs, Wild Asia's dedicated BIO teams conduct community outreach and workshops to create awareness, teach essential skills and guide the farmers as they transition to regenerative practices. Demonstration farms are set up on selected farmers' plots for training and baseline monitoring activities.

Wild Asia embraces a hands-on, practical approach through the 'living lab' concept – a 'lab' that operates in a real-life context to spur innovation and positive impacts. A working farm in Kinabatangan was transformed into an innovations farm, which functions as an applied learning centre and demo farm for workshops and visitors.

Various projects like intercropping, agroforestry, biochar production, and application are piloted here. Soil amendments such as enzyme fertilisers, compost, and biochar are produced in bulk and distributed to farmer networks.

"New BIO farmers get a three-month supply of enzyme liquid fertilisers to give them a head start," says Chang. "Our target is to upscale the fermented fish hydrolysate and bio juice enzyme production to support up to 100 hectares of oil palm blocks annually."

DIY enzyme fertilisers are a good substitute for synthetic fertilisers for farmers who lack resources.

"When Chang introduced me to WAGS BIO, oil palm prices hit an all-time low, and I had to cut expenses. Making my compost and fertiliser was a good alternative to weather the tough period," says Muharram. Plus, reducing fossil fuel-based fertiliser use can be a climate solution.

Since he adopted BIO routines, from cut-and-drop and frond stacking to juice and fish enzyme applications, Muharram could see palpable results within months. Worm castings started popping up, indicating an increase in the earthworm population (WAGS BIO report 2023; p. 33-34). As nature's tillers, earthworms aerate the soil by channelling through it. They feed on organic matter, and their castings put good bacteria, enzymes, plant nutrients, and organic matter back into the soil. The castings also improve soil porosity and water retention.

Perak-based BIO farmer Mat Jailani Arshad shaved off about RM4,000 from his annual fertiliser costs since he swapped synthetic fertiliser for homemade enzyme fertilisers on his 0.6-ha BIO plot. Wild Asia also uses his farm to produce enzyme fertilisers in bulk for BIO farmers in Perak.

"Since I stopped using chemicals and planted beneficial flowering plants for natural pest control, my farm is thriving with insects like beetles, wasps, bees, and grasshoppers," says the MSPO-certified smallholder, also an exemplary BIO farmer. Before joining WAGS BIO in 2021, Mat Jailani stopped using pesticides when raising livestock like cattle, goats, ducks, and geese. He discovered that the grazing livestock helped control weeds and nourish his soil.

Mat Jailani Arshad is a Perak-based BIO farmer who has swapped synthetic fertiliser for homemade enzyme fertilisers on his BIO plot.

"After I sold my cattle and goats, I continued chemical-free farming to keep the momentum going. It has been seven years now. My palm trees are healthy, and my yields are consistent," says the 60-year-old, who regularly hosts university students who do insect surveys on his farm.

Intercropping Benefits

The BIO team also germinates ginger seedlings for farmers to intercrop with oil palm.

Studies have shown that intercropping (growing two or more crops nearby) can generate extra income and improve farm biodiversity. A Universiti Putra Malaysia (UPM) study (Ashraf et al. 2018) showed that alley-cropping systems in oil palm cultivation can boost the diversity of the insect population – key to integrated pest management and ecosystem functions within oil palm production landscapes.

So far, 40 BIO farmers have embraced ginger intercropping with varying outcomes. On his first attempt, Muharram produced a bumper crop of nearly 100 kg of ginger.

"My challenge was trying to sell a huge volume of ginger for the first time," he adds, chuckling. However, his subsequent harvests were not as bountiful due to several factors, such as seasonal floods and types of composts.

"One lesson we learned from this intercropping experiment is that due to intense competition for nutrients, the oil palm roots stunted the growth of ginger rhizomes," says Chang. Consequently, the ginger sizes were small and did not meet commercial standards, thus lowering the sale price.

"We're now looking at growing ginger in bags lined with plastic sheets. Upon harvesting, the organic materials in the bags can be spread around the oil palm trees as mulch and nutrients for the soil."

FREQUENTLY ASKED QUESTIONS (FAQ)

Your essential guide to the palm oil industry, covering nutrition and health, sustainability, environmental impact, and industry best practices.

QUESTION:

Do palm oil and red palm oil come from different sources?

MANY people mistakenly believe that palm and red palm oil come from different sources due to their distinct colours. Palm oil (palm olein) is golden yellow, while red palm oil is vermillion. However, they are extracted from the same fruit, specifically from its mesocarp (the fleshy part of the fruit), which initially yields crude palm oil.

Crude palm oil (CPO) is the raw material used to produce palm olein and red palm oil. Its natural orangey-red colour comes from its high beta-carotene content. However, the final products have different colours and properties due to differences in processing.

QUESTION:

What makes palm oil and red palm oil different in colour, and how are they made?

Palm oil, the most commonly used cooking oil, is processed using conventional refining. This involves pre-treatment CPO through degumming and bleaching, deodorisation and deacidification. These steps remove water, gums, waxes, impurities and unwanted materials such as free fatty acids (FFAs), resulting in golden yellow and high-quality palm oil. The refining process occurs at a high temperature (around 240-260°C).

In contrast, red palm oil is produced through a modified physical refining. While it follows a similar refining method to palm oil, the final stages differ. Instead of the standard deodorisation and deacidification, red palm oil undergoes molecular distillation at a lower temperature (< 170°C). This process helps retain phytonutrients, especially beta-carotene, which gives red palm oil its orangey-red colour, and vitamin E tocotrienols, potent antioxidants that support good health.

Physical Refining Process of Palm and Red Palm Oil

Mesocarp of oil palm fruits (fleshy part)

↓

Crude palm oil (CPO)

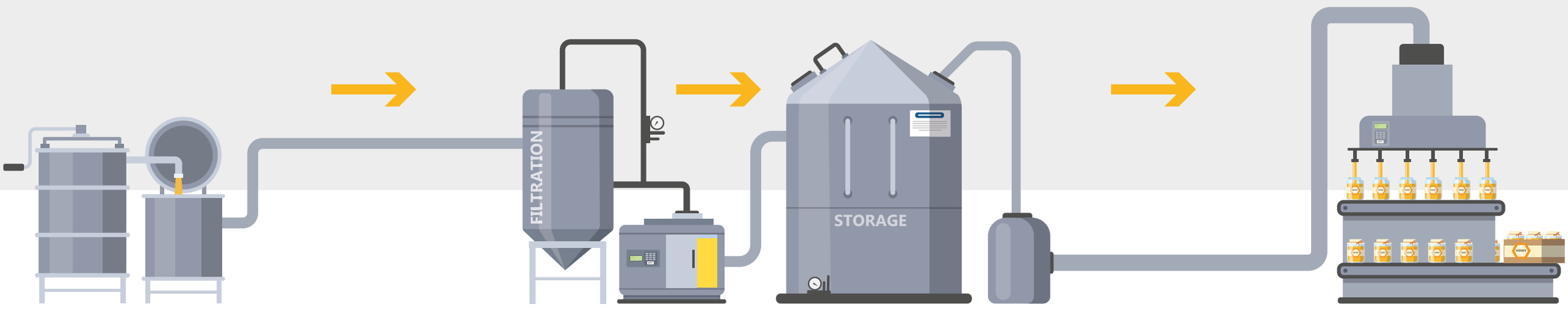
Degumming & Bleaching

Deodorisation & Deacidification

Molecular Distillation

RBD Palm oil

RBD Red palm oil



	Palm Oil	Red Palm Oil
Source / Ingredient	Mesocarp from oil palm fruits / Crude palm oil	Mesocarp from oil palm fruits / Crude palm oil
Processing method	Conventional refining process (degumming, bleaching, deodorisation, and deacidification)	Modified physical refining process (degumming, bleaching, molecular distillation)
Deodorisation and deacidification temperature	240-260°C	<170 °C
Colour	Golden yellow	Orangey red

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